CLAIMS

1. A method of breaking rock includes the steps of:
   (a) loading at least a first cartridge into a hole in a rock face;
   (b) confining the cartridge in the hole;
   (c) initiating a propellant in the cartridge thereby to cause the release of pressurised material,
   (d) supporting a base of the cartridge to prevent the base from fracturing under the effect of the pressurised material, and
   (e) directing the pressurised material at least to a periphery of the base to initiate breakage of rock adjacent the periphery.

2. A method according to claim 1 wherein the cartridge is supported inside the hole at a location which is spaced from the bottom of the hole.

3. A method according to claim 1 or 2 wherein the first cartridge is positioned at a first location at or near a bottom of the hole and a second cartridge is positioned at a second location in the hole which is spaced from the first location.

4. A method according to claim 3 which includes the steps of igniting propellant in the respective cartridges thereby to cause the release of pressurised material inside each cartridge, and at each location directing force which is generated by the respective pressurised material onto a respective surface of a wall of the hole at or near a base of the respective cartridge.

5. A method according to claim 1 wherein the pressurised material generates a pressure wave, the method including the step of deforming the pressure wave to create at least one region inside the hole which has an increased stress concentration.

6. A method according to claim 5 wherein the pressure wave is deformed by at least one of the following: by shaping the cartridge at one or more regions to induce pressure wave deformation; by inserting or forming one or more wave deforming members on an inner or outer side of the cartridge; by locating one or more wave deforming members inside the cartridge.

7. A method according to claim 5 wherein the pressure wave is deformed by suitably shaping a base or a side wall of the cartridge.

8. A method according to any one of claims 1, 5, 6 and 7 which includes the steps of detonating a first high-explosive inside the hole to generate a localised explosive shock wave in the rock.

9. A method according to claim 8 wherein a second high-explosive is detonated a predetermined time period after detonation of the first high-explosive.

10. A method according to claim 1 which includes the step of generating a high pressure jet of a second material which has a density which is greater than the density of the pressurised material.

11. A method according to claim 10 wherein the high pressure jet of the second material is generated at one or more predetermined positions in the cartridge.

12. A method according to claim 10 or 11 wherein the high pressure jet of the second material is generated by the action of the pressurised material, released in step (c), on at least one member which includes the second material.

13. A method according to any one of claims 10 to 12 wherein the high pressure jet of the second material is generated by the action of an explosive on at least one member which includes the second material.

14. A method according to claim 13 wherein the explosive is detonated by control means.

15. A method according to claim 1 wherein the propellant is initiated at a first predetermined time at least at a first zone and which includes the step at a second predetermined time of carrying out at least one of:

(i) detonating an explosive in the hole, and

(ii) initiating the propellant at least at a second zone in the hole.

16. A method according to claim 15 wherein the explosive is inside the cartridge or on an outer side of the cartridge.

17. A method according to claim 15 or 16 wherein the propellant and the explosive are initiated and detonated, respectively, by means of respective control signals which are transmitted from a control unit or units via control lines or by using wireless techniques.

18. A method according to claim 1 wherein the propellant creates a first pressure wave and which includes the steps of creating a second pressure wave and allowing the pressure waves to interfere with each other at a predetermined region.

19. A method according to claim 18 wherein the pressure waves are generated by initiating the propellant at two respective points which are spaced from each other.

20. A method according to claim 1 wherein in step (c) the propellant is initiated at least at first and second points which are spaced from each other in the cartridge, thereby to generate at least two wave fronts which are caused to interact with each other, each wave front causing the release of pressurised material.

21. A method according to claim 20 wherein the cartridge is elongate and the first and second points are located respectively at opposed ends of the cartridge.

22. A method according to claim 1 which includes the steps of loading a second cartridge into the hole and initiating the propellant in the first cartridge and a propellant in the second cartridge at respective first and second points thereby to cause the generation of pressure waves which are allowed to interact with each other at a location which is between the first and second points.

23. Apparatus for breaking rock which includes a first cartridge with a base and a side wall which form an enclosure, and a propellant inside the enclosure, and wherein a discontinuous relatively weaker region of the container is formed at a junction between the wall and the base.

24. Apparatus according to claim 23 wherein the cartridge is shaped to direct a wave of pressurised material, produced by the propellant when initiated, towards a periphery of the base.

25. Apparatus according to claim 23 or 24 which includes at least one pressure wave deforming member which is exposed to a pressure wave generated by initiating the propellant.

26. Apparatus according to claim 25 wherein the pressure wave deforming member is selected from the following: at least one formation on or near the base; at least one formation on an inner or outer surface of the side wall; at least one suitably shaped member inside the cartridge, or outside the cartridge; at least one suitably shaped member inside the propellant positioned at a desired distance relatively to the base.

27. Apparatus according to any one of claims 23 to 26 which includes at least one high-explosive charge on or inside the cartridge.

28. Apparatus according to any one of claims 23 to 27 wherein the cartridge is made from a plastically deformable material.

29. Apparatus according to any one of claims 23 to 28 which includes at least one member, which is made from a material which has a density greater than the density of the propellant, on or inside the cartridge.

30. Apparatus according to claim 29 wherein the member is turned into a high pressure jet by the action of the propellant when it is ignited.

31. Apparatus according to claim 29 or 30 wherein an explosive which acts directly on the member is used to generate a high pressure jet of the material.

32. Apparatus according to any one of claims 23 to 31 which includes an explosive, and a control unit which initiates the propellant at a first predetermined time and which detonates the explosive at a second predetermined time.

33. Apparatus according to any one of claims 23 to 32 which includes at least first and second initiators for initiating the propellant at respective first and second points which are spaced from each other inside the cartridge.

34. Apparatus according to any one of claims 23 to 32 which includes a second cartridge which forms an enclosure for a propellant, each cartridge including a respective initiator for initiating the propellant in the respective enclosure, and wherein the cartridges are positioned in an assembly with the initiators at opposed remote points in the assembly.